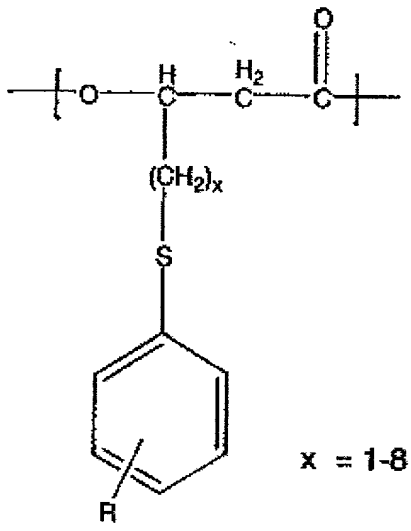
WHAT IS CLAIMED IS:

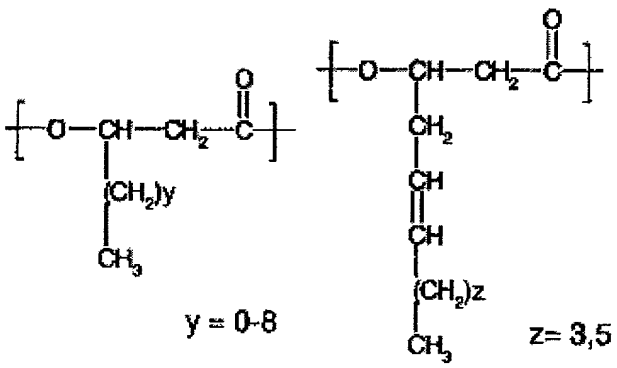
1. A polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1).



(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8; with the proviso that a polyhydroxyalkanoate is excluded which has a hydrogen atom as R and x in all the units is 2 or 4.

2. The polyhydroxyalkanoate according to claim 1, which contains, in addition to the unit represented by Chemical Formula (1), at least one of units represented by Chemical Formulas (2) and (3).

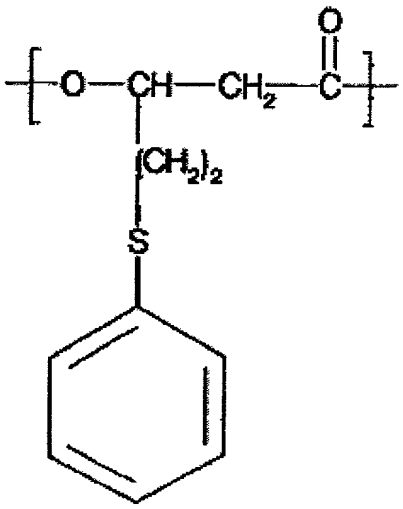


(2) (3)

wherein y and z may assume any one integral value within the range shown in the chemical formulas, independently from the unit represented by Chemical Formula (1).

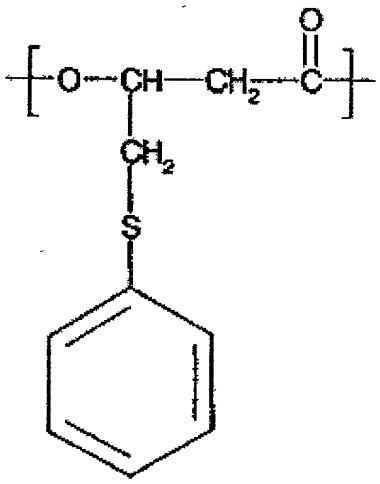
3. The polyhydroxyalkanoate according to claim 1, which has a number-average molecular weight in the range of from 1,000 to 500,000.

4. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-5-phenylsulfanyl valeric acid unit represented by Chemical Formula (4).



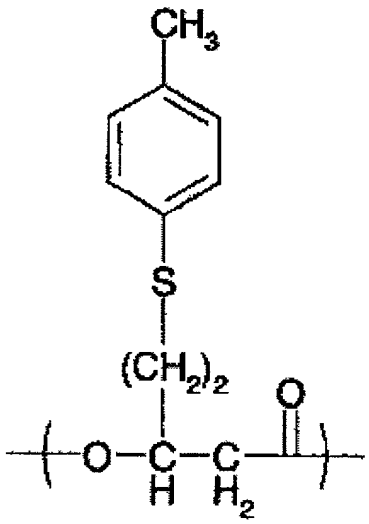
(4)

5. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-4-phenylsulfanyl butyric acid unit represented by Chemical Formula (5).



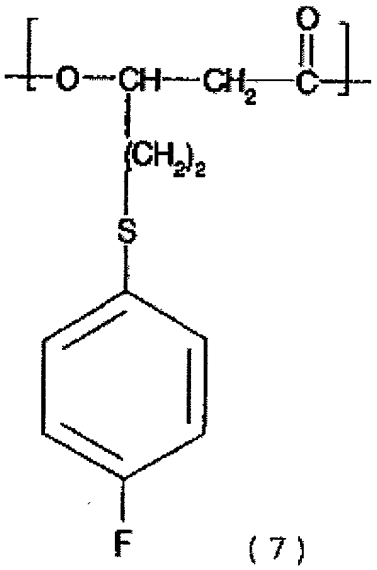
(5)

6. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-5-[(4-methylphenyl)sulfanyl] valeric acid unit represented by Chemical Formula (6).



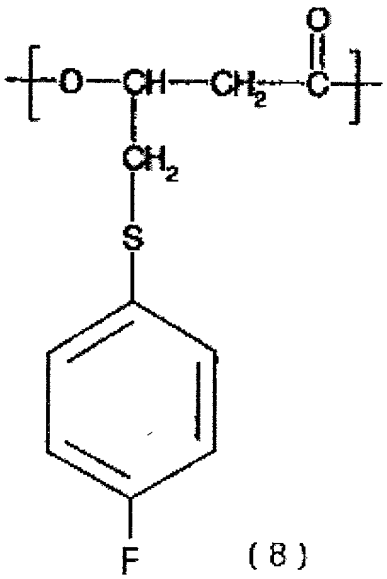
(6)

7. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-5-[(4-fluorophenyl)sulfanyl]valeric acid unit represented by Chemical Formula (7).



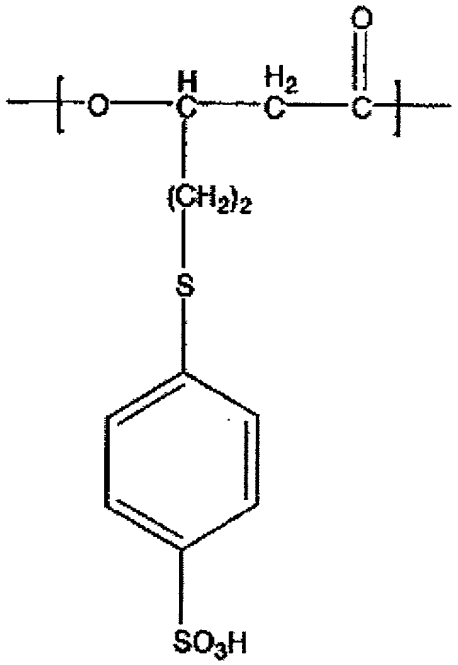
(7)

8. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-4-[(4-fluorophenyl)sulfanyl]butyric acid unit represented by Chemical Formula (8).



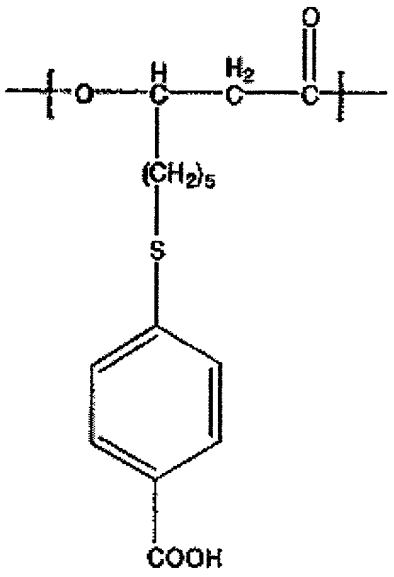
(8)

9. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-5-[(4-sulfophenyl)sulfanyl]valeric acid unit represented by Chemical Formula (9).



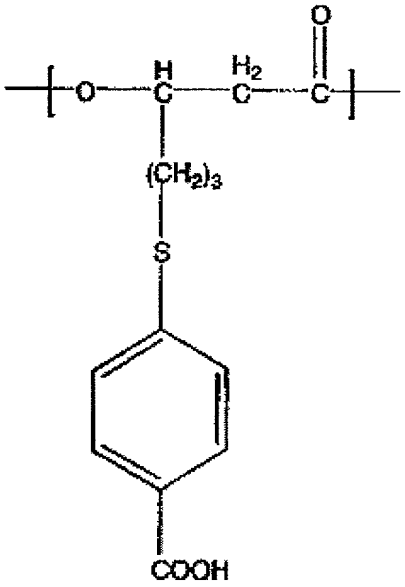
(9)

10. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-8-[(4-carboxyphenyl)sulfanyl]octanoic acid unit represented by Chemical Formula (10).



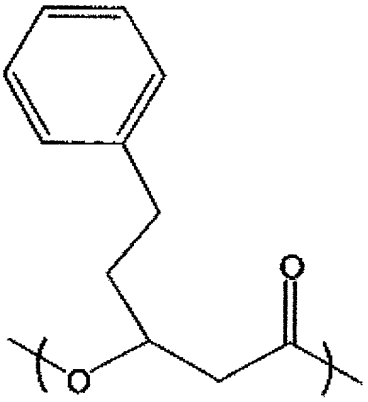
(10)

11. The polyhydroxyalkanoate according to claim 1, which contains a 3-hydroxy-6-[(4-carboxyphenyl)sulfanyl]hexanoic acid unit represented by Chemical Formula (11).



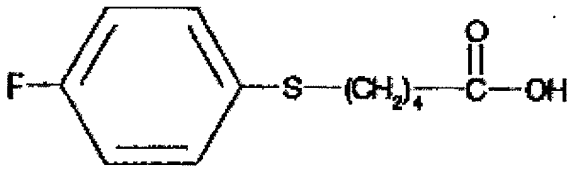
(11)

12. The polyhydroxyalkanoate according to claim 10, which contains, in addition to the 3-hydroxy-8-[(4-carboxyphenyl)sulfanyl]octanoic acid unit represented by Chemical Formula (10) or 3-hydroxy-6-[(4-carboxyphenyl)sulfanyl]hexanoic acid unit represented by Chemical Formula (11), a 3-hydroxy-5-phenylvaleric acid unit represented by Chemical Formula (12).



(12)

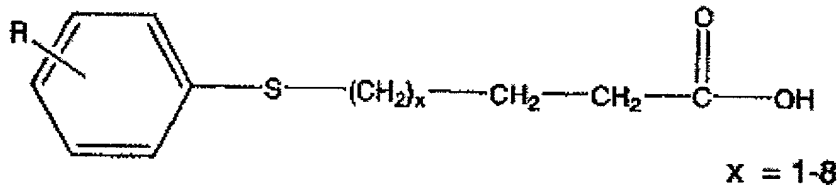
13. A 5-[(4-fluorophenyl)sulfanyl]valeric acid represented by Chemical Formula (13).



(13)

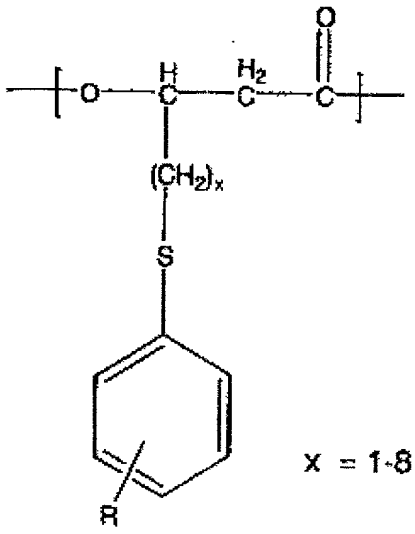
14. A process for producing a polyhydroxyalkanoate having in the molecule a unit

represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14), and the step of culturing a microorganism in the culture medium.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x may assume any one integral value within the range shown in the chemical formula.

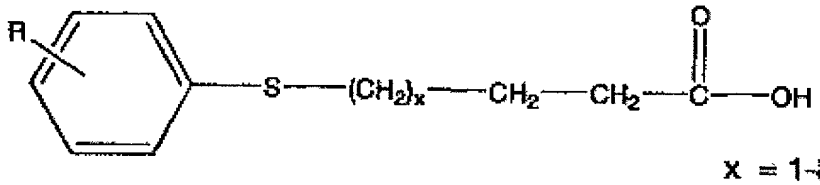


(1)

wherein R is arbitrarily selected from a

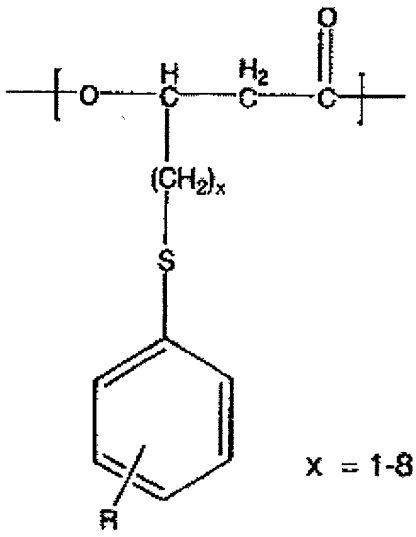
hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8; with the proviso that a polyhydroxyalkanoate is excluded which has a hydrogen atom as R and x in all the units is 2 or 4.

15. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and polypeptone, and the step of culturing a microorganism in the culture medium.



(14)

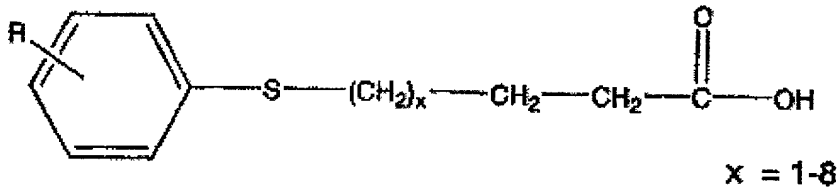
wherein R is arbitrarily selected from a hydrogen atom , a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



(1)

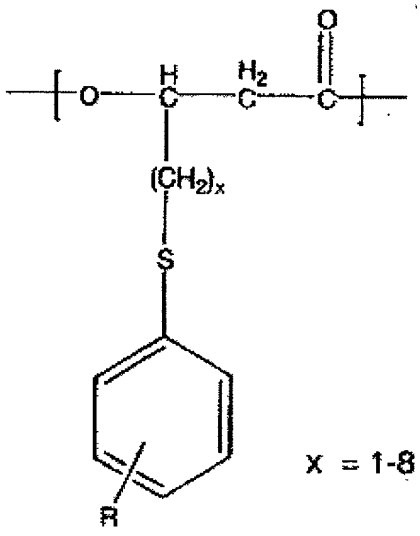
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

16. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and yeast extract, and the step of culturing a microorganism in the culture medium.



(14)

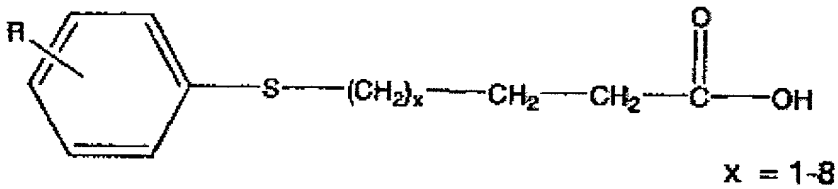
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



(1)

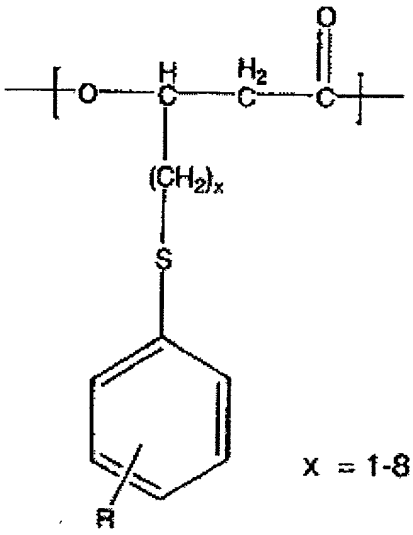
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

17. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and saccharide, and the step of culturing a microorganism in the culture medium.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



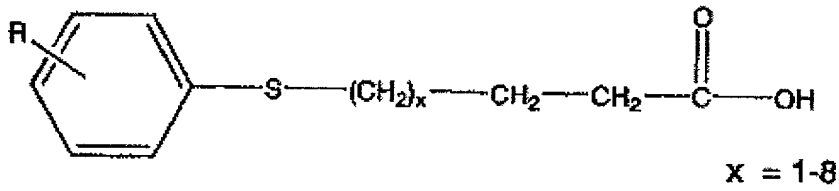
(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

18. The process according to claim 16, wherein the saccharide is at least one compound selected from glyceraldehyde, erythrose, arabinose, xylose, glucose, galactose, mannose, fructose, glycerol, erythritol, xylitol, gluconic acid, glucuronic acid, galacturonic acid, maltose, sucrose and lactose.

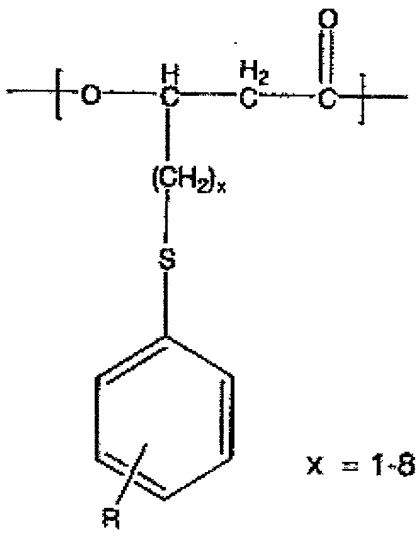
19. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process

comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and an organic acid or a salt thereof, and the step of culturing a microorganism in the culture medium.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



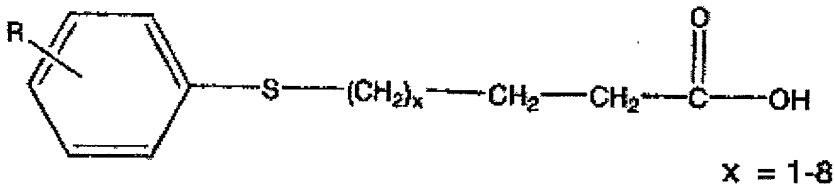
(1)

wherein R is arbitrarily selected from a

hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

20. The process according to claim 19, wherein the organic acid or the salt thereof is at least one compound selected from pyruvic acid, malic acid, lactic acid, citric acid and succinic acid and a salt of any of these.

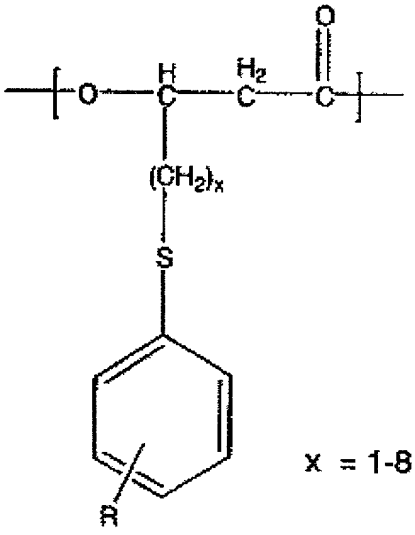
21. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and amino acid or a salt thereof, and the step of culturing a microorganism in the culture medium.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R",

CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



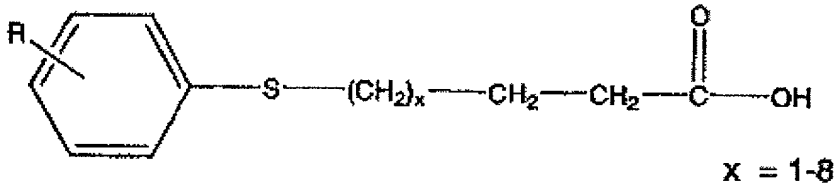
(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

22. The process according to claim 21, wherein the amino acid or the salt thereof is at least one compound selected from glutamic acid and aspertic acid and a salt of any of these.

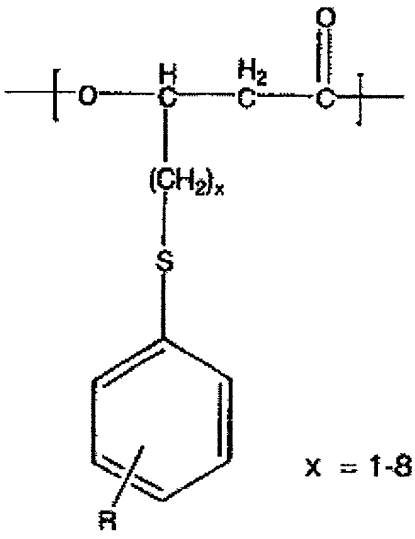
23. A process for producing a

polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the step of preparing a culture medium containing at least one compound represented by Chemical Formula (14) and a straight-chain alkanoic acid having 4 to 12 carbon atoms or a salt thereof, and the step of culturing a microorganism in the culture medium.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



(1)

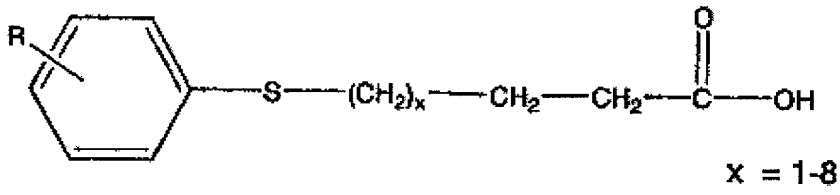
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

24. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the steps of:

(step 1-1) culturing a microorganism in a culture medium containing at least one compound represented by Chemical Formula (14) and containing polypeptone; and subsequently thereto

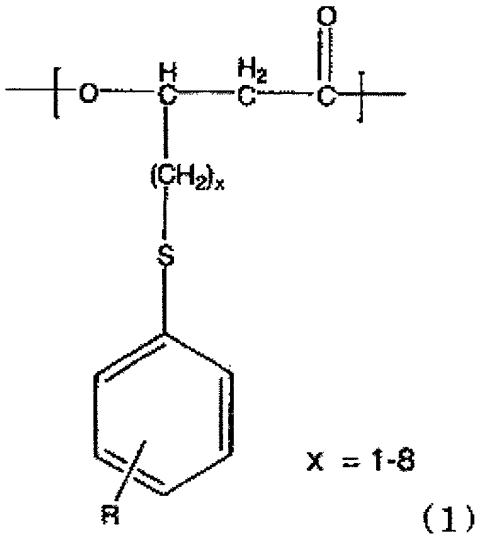
(step 2-1) further culturing the microorganism cultured in the step 1-1, in a culture medium

containing at least one compound represented by Chemical Formula (14) and containing an organic acid or a salt thereof.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.



(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H,

Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

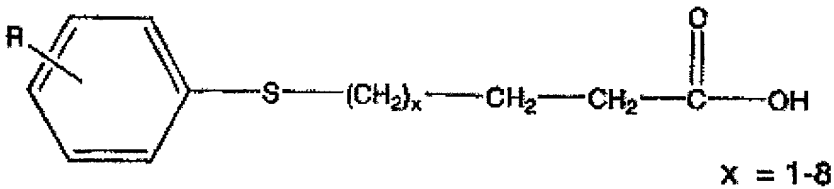
25. The process according to claim 24, wherein the medium do not contain nitrogen source in the step 2-1.

26. The process according to claim 24, wherein the organic acid or the salt thereof is at least one compound selected from pyruvic acid, malic acid, lactic acid, citric acid and succinic acid and a salt of any of these.

27. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process comprising the steps of:

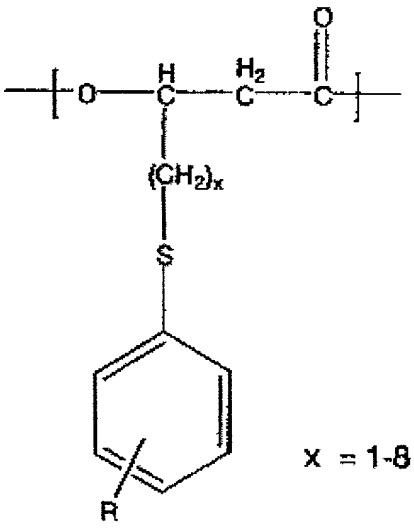
(step 1-2) culturing a microorganism in a culture medium containing at least one compound represented by Chemical Formula (14) and containing a saccharide; and subsequently thereto

(step 2-2) further culturing the microorganism cultured in the step 1-2, in a culture medium containing at least one compound represented by Chemical Formula (14) and containing a saccharide.



(14)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

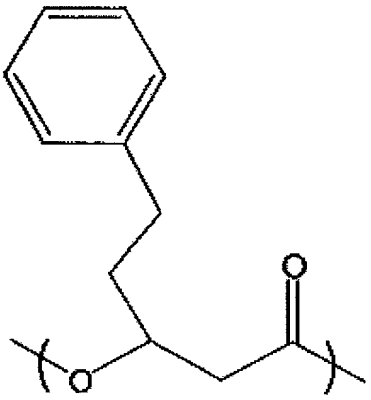


(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8.

28. The process according to claim 27, wherein the medium do not contain nitrogen source in the step 2-2.

29. The process according to claim 27, wherein the polyhydroxyalkanoate further contains a unit represented by Chemical Formula (12) as a unit other than the unit represented by Chemical Formula (1).

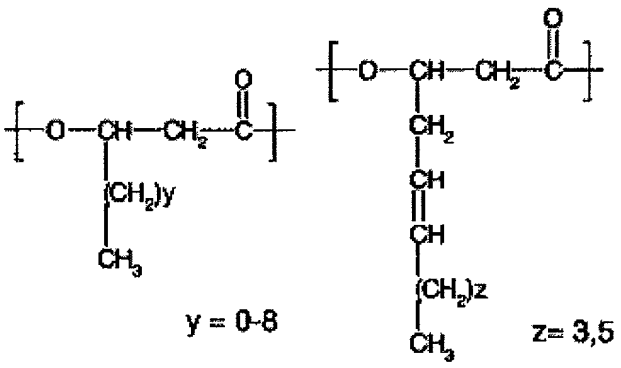


(12)

30. The process according to claim 29, wherein the saccharide is at least one compound selected from glyceraldehyde, erythrose, arabinose, xylose, glucose, galactose, mannose, fructose, glycerol, erythritol, xylitol, gluconic acid, glucuronic acid, galacturonic acid, maltose, sucrose and lactose.

31. The process according to claim 14, wherein the polyhydroxyalkanoate contains as a unit other

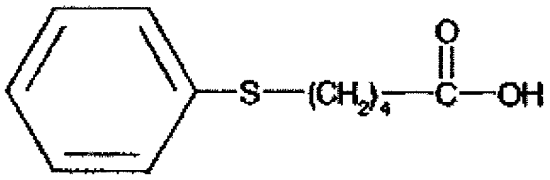
than the unit represented by Chemical Formula (1), at least one of units represented by Chemical Formulas (2) and (3).



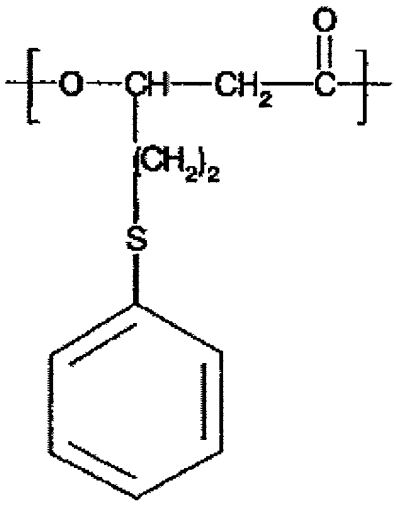
(2) (3)

wherein y and z may assume any one integral value within the range shown in the chemical formulas, independently from the unit represented by Chemical Formula (1).

32. The process according to claim 14, wherein the microorganism is cultured in a culture medium containing a 5-phenylsulfanyl valeric acid represented by Chemical Formula (15), to produce a polyhydroxyalkanoate containing a 3-hydroxy-5-phenylsulfanyl valeric acid unit represented by Chemical Formula (4).

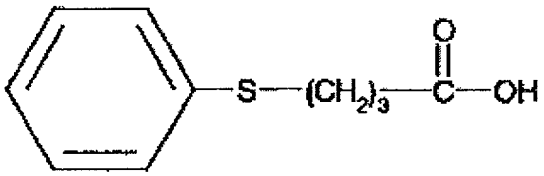


(15)

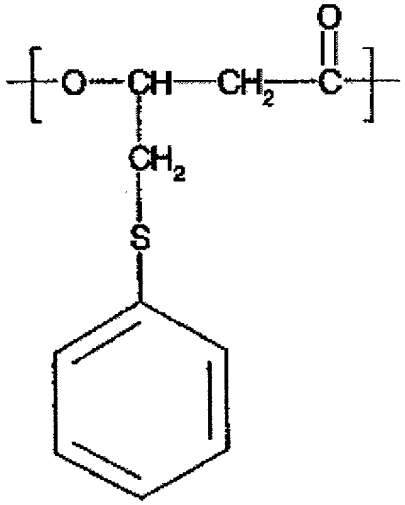


(4)

33. The process according to claim 14, wherein the microorganism is cultured in a culture medium containing a 4-phenylsulfanyl butyric acid represented by Chemical Formula (16), to produce a polyhydroxyalkanoate containing a 3-hydroxy-4-phenylsulfanyl butyric acid unit represented by Chemical Formula (5).

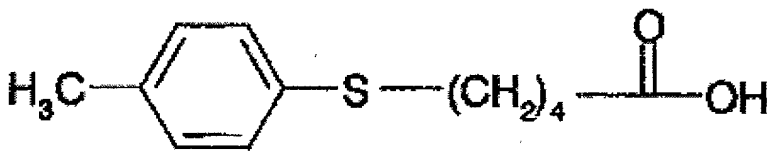


(16)

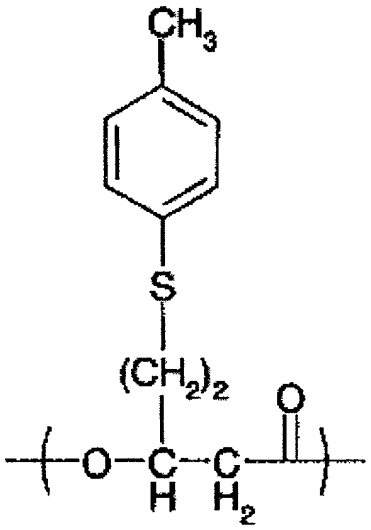


(5)

34. The process according to claim 14, wherein the microorganism is cultured in a culture medium containing a 5-[(4-methylphenyl)sulfanyl]valeric acid represented by Chemical Formula (17), to produce a polyhydroxyalkanoate containing a 3-hydroxy-5-[(4-methylphenyl)sulfanyl]valeric acid unit represented by Chemical Formula (6).

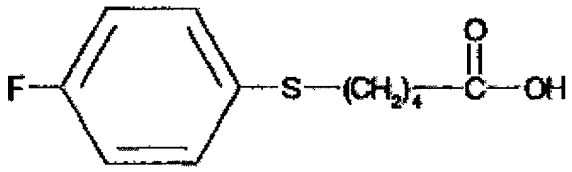


(17)

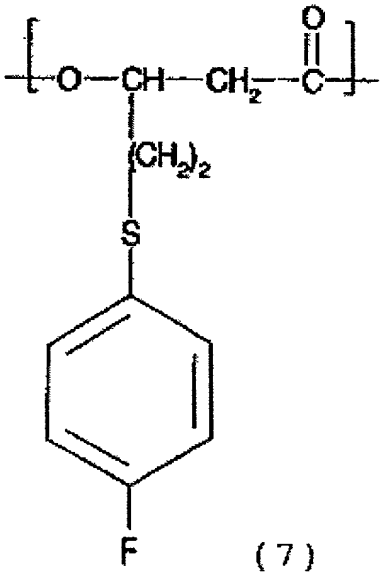


(6)

35. The process according to claim 14, wherein the microorganism is cultured in a culture medium containing a 5-[(4-fluorophenyl)sulfanyl]valeric acid represented by Chemical Formula (13), to produce a polyhydroxyalkanoate containing a 3-hydroxy-5-[(4-fluorophenyl)sulfanyl]valeric acid unit represented by Chemical Formula (7).

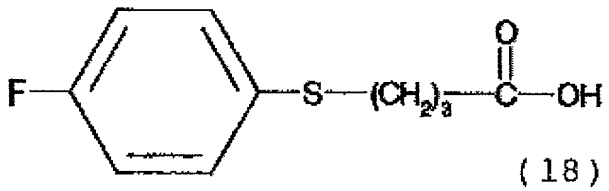


(13)

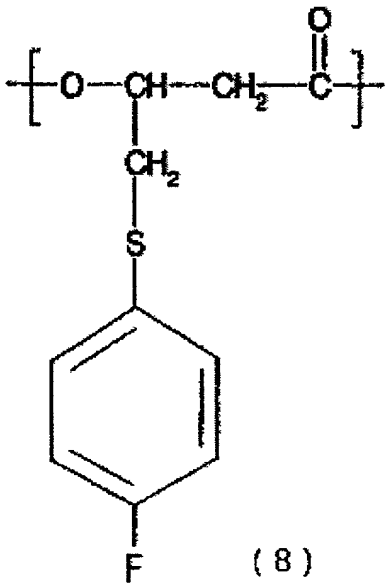


(7)

36. The process according to claim 14, wherein the microorganism is cultured in a culture medium containing a 4-[(4-fluorophenyl)sulfanyl]butyric acid represented by Chemical Formula (18), to produce a polyhydroxyalkanoate containing a 3-hydroxy-4-[(4-fluorophenyl)sulfanyl]butyric acid unit represented by Chemical Formula (8).

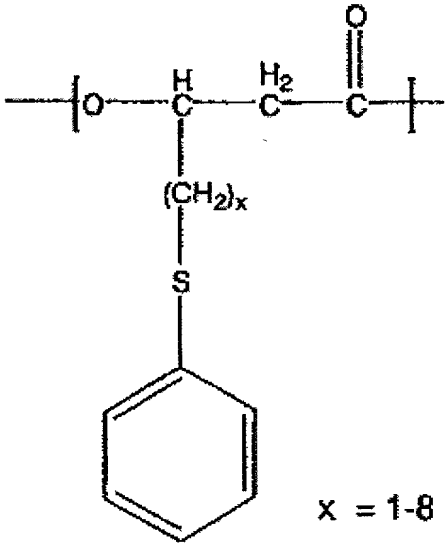


(18)



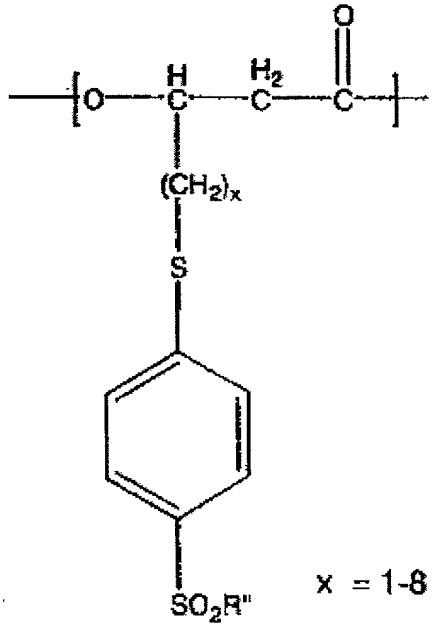
(8)

37. A process for producing a polyhydroxyalkanoate having in the molecule the unit represented by Chemical Formula (20); the process comprising the step of preparing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (19), and the step of sulfonating the polyhydroxyalkanoate with chlorosulfuric acid.



(19)

wherein x may assume any one integral value within the range shown in the chemical formula.

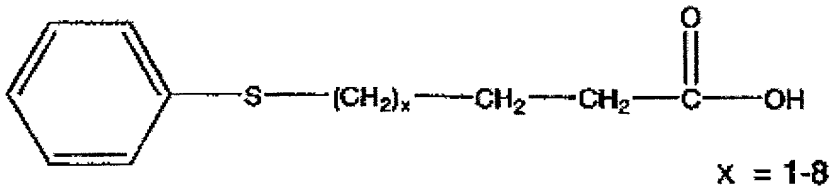


(20)

wherein R" is arbitrarily selected from OH, ONa and OK; and x may assume any one integral value

within the range shown in the chemical formula.

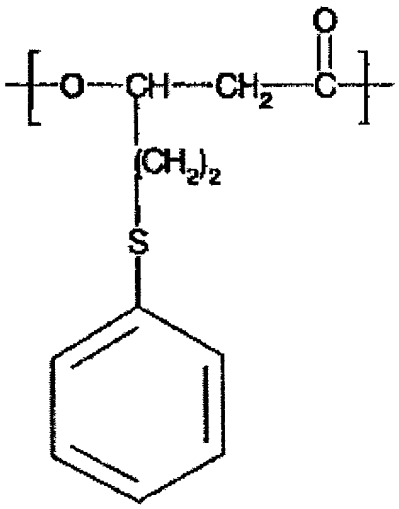
38. The process according to claim 37, wherein the compound represented by Chemical Formula (19) is produced by a process comprising the step of culturing a microorganism in a culture medium containing at least one compound represented by Chemical Formula (21).



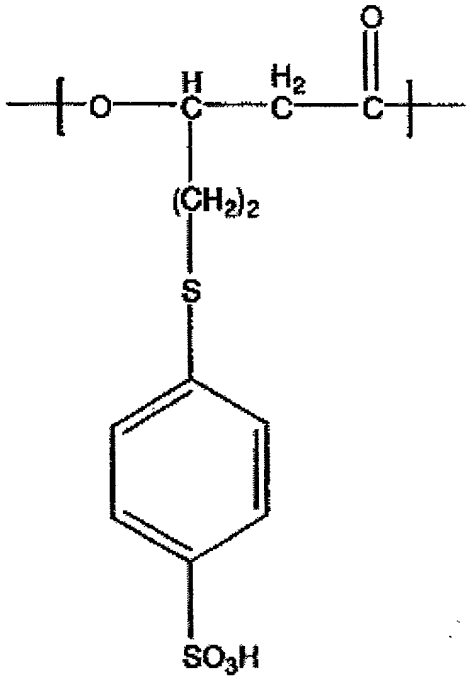
(21)

wherein x may assume any one integral value within the range shown in the chemical formula.

39. The process according to claim 37, wherein a polyhydroxyalkanoate having in the molecule a 3-hydroxy-5-[(4-sulfophenyl)sulfanyl]valeric acid unit represented by Chemical Formula (9) is produced by a process comprising the step of sulfonating with chlorosulfuric acid a polyhydroxyalkanoate having in the molecule a 3-hydroxy-5-(phenylsulfanyl)valeric acid represented by Chemical Formula (4).



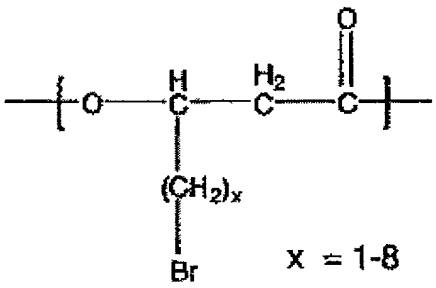
(4)



(9)

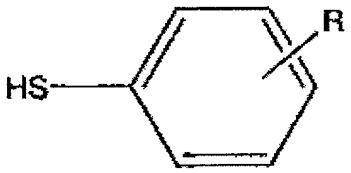
40. A process for producing a polyhydroxyalkanoate having in the molecule a unit

represented by Chemical Formula (1); the process comprising the step of allowing a polyhydroxyalkanoate having in the molecule a 3-hydroxy-ω-bromoalkanoic acid unit represented by Chemical Formula (22), to react with a substituted benzenethiol represented by Chemical Formula (23).



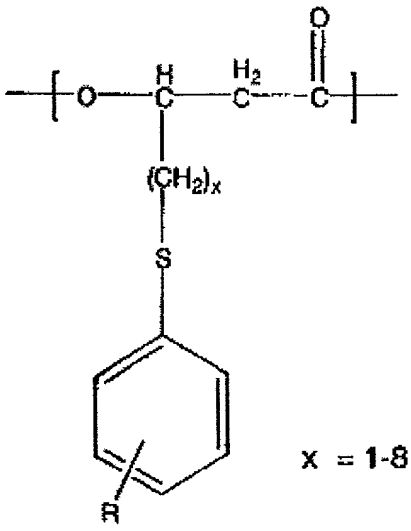
(22)

wherein x may assume any one integral value within the range shown in the chemical formula.



(23)

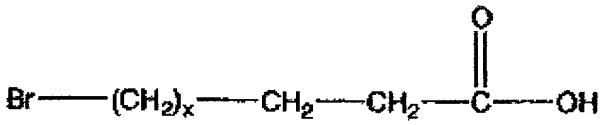
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5.



(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 1 to 8; with the proviso that a polyhydroxyalkanoate is excluded which has a hydrogen atom as R and x in all the units is 2 or 4.

41. The process according to claim 40, wherein the polyhydroxyalkanoate having in the molecule the 3-hydroxy-ω-bromoalkanoic acid unit represented by Chemical Formula (22) is produced by a process comprising the step of culturing a microorganism in a culture medium containing at least one ω-bromoalkanoic acid represented by Chemical Formula (24).

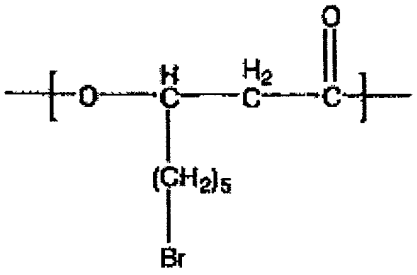


x = 1-8

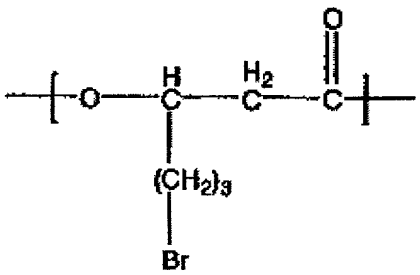
(24)

wherein x may assume any one integral value within the range shown in the chemical formula.

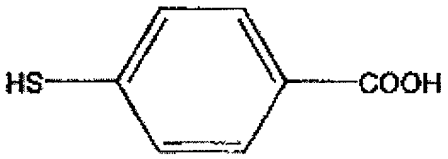
42. The process according to claim 40, wherein a polyhydroxyalkanoate having in the molecule at least one of a 3-hydroxy-8-[(4-carboxyphenyl)sulfanyl]octanoic acid unit represented by Chemical Formula (10) and a 3-hydroxy-6-[(4-carboxyphenyl)sulfanyl]hexanoic acid unit represented by Chemical Formula (11) is produced by a process comprising the step of allowing a polyhydroxyalkanoate having at least one of a 3-hydroxy-8-bromooctanoic acid unit represented by Chemical Formula (25) and a 3-hydroxy-6-bromohexanoic acid unit represented by Chemical Formula (26) to react with 4-mercaptobenzoic acid represented by Chemical Formula (27).



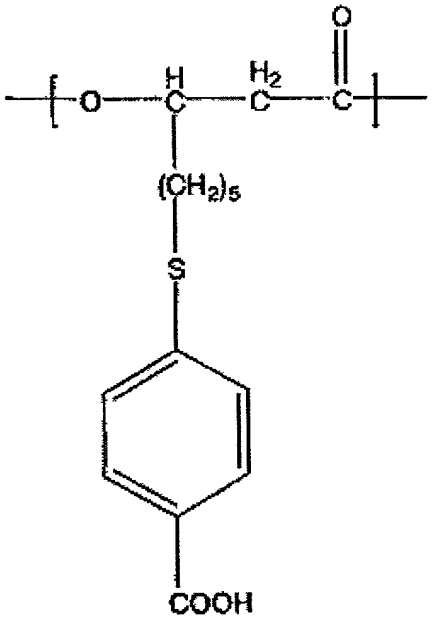
(25)



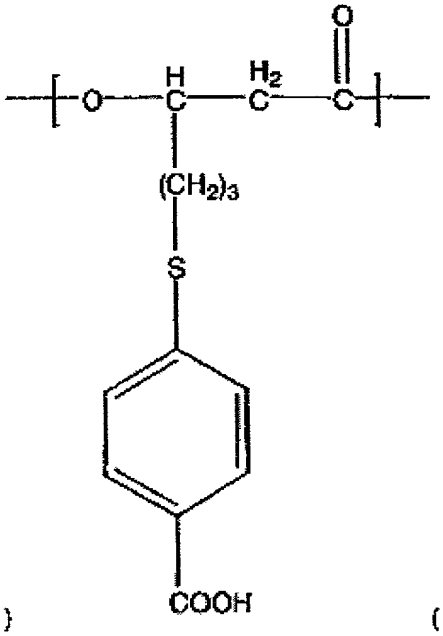
(26)



(27)



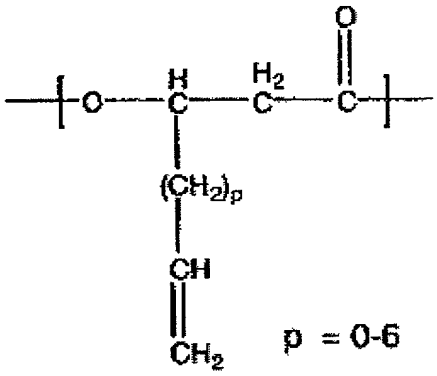
(10)



(11)

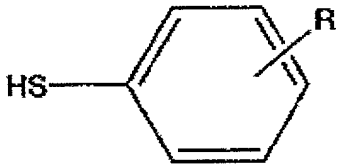
43. A process for producing a polyhydroxyalkanoate having in the molecule a unit represented by Chemical Formula (1); the process

comprising the step of allowing a polyhydroxyalkanoate having in the molecule a 3-hydroxy-ω-alkenoic acid unit represented by Chemical Formula (28), to react with a substituted benzenethiol represented by Chemical Formula (23).



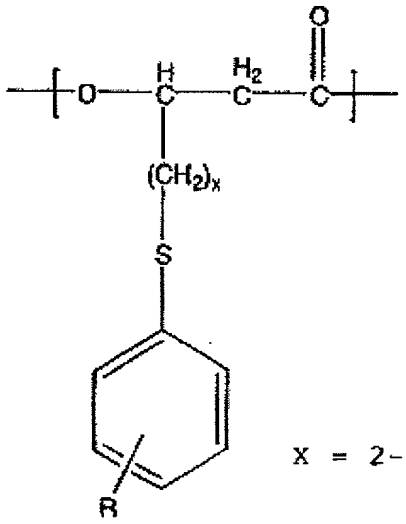
(28)

wherein p may assume any one integral value within the range shown in the chemical formula.



(23)

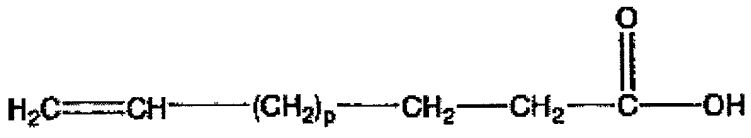
wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5.



(1)

wherein R is arbitrarily selected from a hydrogen atom, a halogen atom, CN, NO_2, COOR', SO_2R", CH_3, C_2H_5, C_3H_7, $C(CH_3)_2H$ and $C(CH_3)_3$; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x is an integer arbitrarily selected from 2 to 8; with the proviso that a polyhydroxyalkanoate is excluded which has a hydrogen atom as R and x in all the units is 2 or 4.

44. The process according to claim 43, wherein the polyhydroxyalkanoate having in the molecule the 3-hydroxy-ω-alkenoic acid unit represented by Chemical Formula (28) is produced by a process comprising the step of culturing a microorganism in a culture medium containing at least one ω-alkenoic acid represented by Chemical Formula (29).



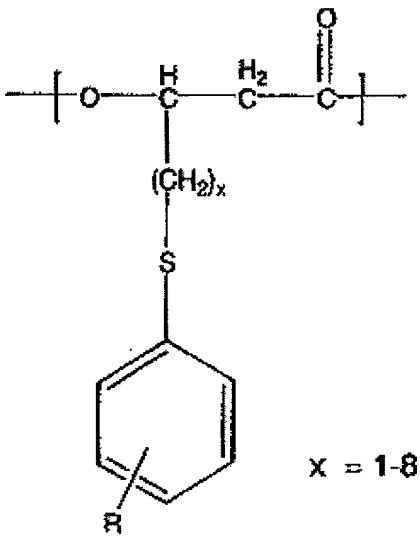
p = 0-6 (29)

wherein p may assume any one integral value within the range shown in the chemical formula.

45. The process according to claim 14, wherein the microorganism belongs to genus Pseudomonas.

46. The process according to claim 45, wherein the microorganism is at least one selected from the group consisting of *Pseudomonas cichorii* YN2, FERM BP-7375, *Pseudomonas cichorii* H45, FERM BP-7374, *Pseudomonas jessenii* P161, FERM BP-7376, and *Pseudomonas putida* P91, FERM BP-7373.

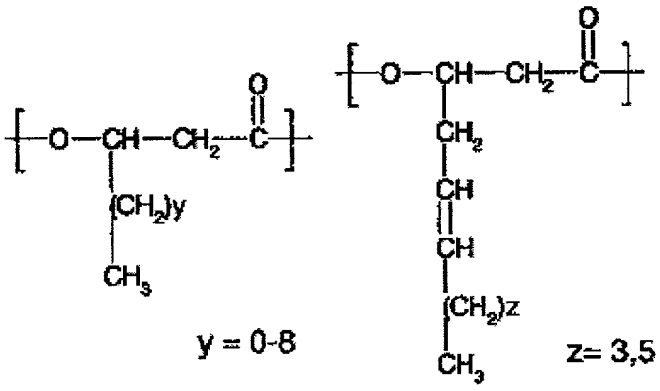
47. A charge control agent for controlling the state of charge of a powder, which charge control agent comprises a polyhydroxyalkanoate having in the molecule at least one unit of units represented by Chemical Formula (1).



(1)

wherein R is arbitrarily selected from COOR' and SO_2R"; where R' is H, Na, K, CH_3 or C_2H_5, and R" is OH, ONa, OK, a halogen atom, OCH_3 or OC_2H_5; and x may assume any one integral value within the range shown in the chemical formula.

48. The charge control agent according to claim 47, which contains, in addition to the unit represented by Chemical Formula (1), each independently or the both of units represented by Chemical Formulas (2) and (3).



(2) (3)

wherein y and z may assume any one integral value within the range shown in the chemical formulas, independently from the unit represented by Chemical Formula (1).

49. The charge control agent according to claim 47, wherein the powder is a toner for developing electrostatic latent images.

50. The charge control agent according to claim 47, wherein the polyhydroxyalkanoate has a number-average molecular weight of from 1,000 to 500,000.

51. A toner binder used in a toner for developing electrostatic latent images, which toner binder comprises the charge control agent according to claim 47.

52. A toner for developing electrostatic latent images, which toner comprises a binder resin, a colorant and the charge control agent according to claim 47.

53. An image-forming method comprising:

a charging step of applying a voltage to a charging member from its outside to charge an electrostatic-latent-image-bearing member electrostatically;

a latent-image-forming step of forming an electrostatic latent image on the electrostatic-latent-image-bearing member thus charged;

a developing step of developing the electrostatic latent image by the use of a toner for developing electrostatic latent images, to form a toner image on the electrostatic-latent-image-bearing member;

a transfer step of transferring to a recording medium the toner image formed on the electrostatic-latent-image-bearing member; and

a heat fixing step of fixing by heat the toner image held on the recording medium;

wherein the toner for developing electrostatic latent images comprises a binder resin, a colorant and the charge control agent according to claim 47.

54. An image-forming method comprising:

a charging step of applying a voltage to a charging member from its outside to charge an electrostatic-latent-image-bearing member electrostatically;

a latent-image-forming step of forming an electrostatic latent image on the electrostatic-latent-image-bearing member thus charged;

a developing step of developing the electrostatic latent image by the use of a toner for developing electrostatic latent images, to form a toner image on the electrostatic-latent-image-bearing member;

a first transfer step of transferring to an intermediate transfer member the toner image formed on the electrostatic-latent-image-bearing member;

a second transfer step of transferring to a recording medium the toner image held on the intermediate transfer member; and

a heat fixing step of fixing by heat the toner image held on the recording medium;

wherein the toner for developing electrostatic latent images comprises a binder resin, a colorant and the charge control agent according to claim 47.

55. An image-forming apparatus comprising:

a charging means for applying a voltage to a charging member from its outside to charge an electrostatic-latent-image-bearing member electrostatically;

a latent-image-forming means for forming an electrostatic latent image on the electrostatic-latent-image-bearing member thus charged;

a developing means for developing the electrostatic latent image by the use of a toner for developing electrostatic latent images, to form a toner image on the electrostatic-latent-image-bearing member;

a transfer means for transferring to a recording medium the toner image formed on the electrostatic-latent-image-bearing member; and

a heat fixing means for fixing by heat the toner image held on the recording medium;

wherein the toner for developing electrostatic latent images comprises a binder resin, a colorant and the charge control agent according to claim 47.

56. An image-forming apparatus comprising:

a charging means for applying a voltage to a charging member from its outside to charge an electrostatic-latent-image-bearing member electrostatically;

a latent-image-forming means for forming an electrostatic latent image on the electrostatic-latent-image-bearing member thus charged;

a developing means for developing the electrostatic latent image by the use of a toner for developing electrostatic latent images, to form a toner image on the electrostatic-latent-image-bearing member;

a first transfer means for transferring to an intermediate transfer member the toner image formed on the electrostatic-latent-image-bearing member;

a second transfer means for transferring to a recording medium the toner image held on the intermediate transfer member; and

a heat fixing means for fixing by heat the toner image held on the recording medium;

wherein the toner for developing electrostatic latent images comprises a binder resin, a colorant and the charge control agent according to claim 47.